CONNECTICUT ASSOCIATION OF ATHLETIC DIRECTORS,INC.

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March 5, 2014

Testimony Regarding:
SB 46 - AN ACT CONCERNING PESTICIDES ON SCHOOL GROUNDS.

Good afternoon Senator Bartolomeo, Representative Urban, Senator Linares, Representative Betts and the distinguished members of the Children Committee . My name is Fred Balsamo, Executive Director for the Connecticut Association of Athletic Directors (CAAD), which represents the athletic directors in 188 high schools and 150 middle school athletic programs across the state.

We can all agree that the environment is a major concern to all of us. However, CAAD's primary concern is in student safety and legislation of this type can have an adverse effect on the increase of injuries to our athletes, including concussions. Members of our organization have reported to us that as a result of the current K-8 ban schools have lost the use of their fields or they have become dangerously compacted. Most high school fields require extensive use in order to implement a comprehensive athletic program. Prudent use of chemical treatments is necessary to allow maximum usage of those fields.

There have been several notable studies conducted as it relates to injuries caused by poor field conditions. We have contacted an independent field testing lab, Sports Labs USA, which is contracted to evaluate the safety of all 31 NFL fields and they write– ***"In regard to natural grass fields: it is our opinion that the inherent safety and ability to prevent injury associated with these fields is directly related to the blade-density of the grass and the ability to properly maintain that density. It is also our opinion that it is not possible to maintain the density and growth, required for safe play, nor adequately defend the natural growth process against the impact of frequent athletic events, without employing significant chemical treatments and/or enhancements."*** (see attached)

Furthermore, in a 2011 University of Iowa Study[1] it is stated – ***"Field hardness increased the incidence of lower extremity injuries in football"*** and a Study Penn State[2] conducted in 1981 ***" 20% of Injuries reported and treated for football could have been avoided if the fields were softer, better cared for and had less compacted soil"*** and also at Penn State in 2004 – ***10% of concussions were caused by a head hitting the surface of the field."***

Additionally, since the July 1, 2010 K-8 ban, schools have reported having problems with grub and tick populations, poison ivy taking over fence lines, planting beds and boundary areas as well as poor compacted athletic fields just to name a few of the problems. All of these issues present a hazard to students because the ban does not allow any EPA registered pest controls to be used. SB 46 would devastate high school athletic programs and increase injuries.

Sincerely,

Fred Balsamo

Fred Balsamo, CMAA, Executive Director
Connecticut Association of Athletic Directors

[1]Iacovelli, Jaclyn Nicole. "Effect of field condition and shoe type on lower extremity injuries in American football." master's Master's thesis, University of Iowa, 2011. http://ir.uiowa.edu/etd/1148.

[2]*J.C. Harper, C.A. Moorehouse, D.V.Waddington, and W.E. Buckley,* **Turf Management, Athletic-fieldConditions, and Injuries in High SchoolFootball,** Pennsylvania State University , 2010 -Reprintedfrom The Turf Line News, Vol. 120, No.2, pp. 28 - 33, 1994J- http://archive.lib.msu.edu/tic/stnew/article/1994sep6.pdf

dma sports labs usa

Sport Surfaces Testing & Consulting

January 23, 2014

Whom It May Concern,

Our company, Sports Labs USA, provides certified testing services, including ASTM F-355, commonly referred to as G-Max. The G-Max test results predict the shock attenuating capacity of an athletic field and other related tests measure the response and performance characteristics of the surface system. The 'G-Max test' has become a priority focus with respect to sport fields because of the increased awareness of concussive injuries and recent publicity surrounding their frequency of occurrence. The shock attenuating capacity of a field directly relates to injuries that occur as a result of bodily impact on the surface; which is why all new synthetic fields should be tested and certified as to G-Max, *in-situ*, post-installation - before safe use can be allowed.

G-Max testing is, likewise, used extensively on natural grass fields to insure the safety of the participants. We are currently contracted with the National Football League (NFL) for testing and certification of all 31 NFL Stadium fields, including both synthetic and natural grass fields.

In regard to natural grass fields: it is our opinion that the inherent safety and ability to prevent injury associated with these fields is directly related to the blade-density of the grass and the ability to properly maintain that density. It is also our opinion that it is not possible to maintain the density and growth, required for safe play, nor adequately defend the natural growth process against the impact of frequent athletic events, without employing significant chemical treatments and/or enhancements.

Please feel free to contact this office if you any further questions or concerns.

Yours truly,

Joseph W. DiGeronimo, STC
Principal

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Turf Management, Athletic-field Conditions, and Injuries in High School Football

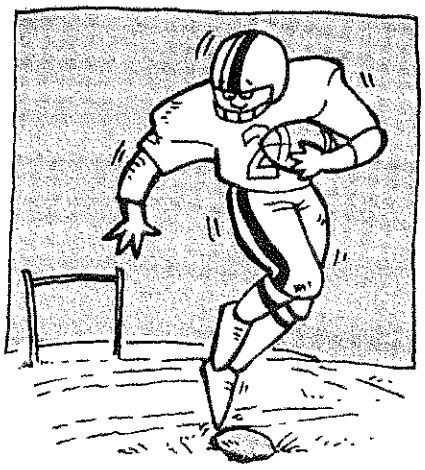
J.C. Harper, C.A. Moorehouse, D.V. Waddington, and W.E. Buckley
Pennsylvania State University

The wide range of turfgrass conditions existing on high school athletic fields in Pennsylvania may reflect: i) procedures used during construction, ii) past and current maintenance practices, iii) intensity of use, or iv) a combination of these factors. The conditions of a playing field is not only of aesthetic importance, but it also may affect play and player safety.

The prevention of athletic injuries, particularly in a violent contact sport such as football, is of major concern to most educational institutions. At college level, comparison of natural turf and artificial surfaces in regard to football injuries has received attention in recent years, but differences in quality of the turf on grassed fields has been a topic that has received only minor attention.

Wilcox, Fox, and Beyer [Athl. J. 45(10):34, 1965] reported a pronounced reduction in practice field injuries at one high school when practice sessions were moved from a dry and heavily compacted area to a field where the turf had been adequately maintained. Of course, the reduction in injuries may have been influenced by factors not under consideration. Also, conclusions based on data from a single high school may not be valid for other schools. Sanderson [Athl. Purch. and Facil. 4 (5) 54, 1979] stated that soil compaction of athletic fields is a leading cause of football players' knee injuries. He advocated a full maintenance program of aerification, overseeding, fertilization, and weed control to provide a playing surface that would tend to reduce the incidence and severity of injuries.

Well controlled studies of the effects of turf management practices on the incidence of injuries in football are needed. The purposes of this study were i) to evaluate conditions of high school game and practice fields and determine the relationship of field conditions to maintenance programs; ii) to determine if a relationship existed between field conditions and the incidence of field related injuries in high school football, and iii) to provide professional advice concerning turf management programs in an effort to improve the quality of high school football fields.



Experimental Procedure

Selection of Participants:

In May, 1981, all high school athletic trainers who were active members of the Pennsylvania Athletic Trainers' Association were mailed a brief description of the proposed project. Trainers used the enclosed response card to indicate whether their school agreed to participate in the study and whether they were willing to provide the required reports of injury throughout the 1981 football season.

While most trainers expressed interest in the study, only 12 schools were willing to participate. This sample came from various locations across the state and provided 24 fields (12 game fields and 12 practice fields) for evaluation. Two of the schools did not provide a complete record of injuries, so injury results and correlations involving injuries are based on the data from 10 schools. Field condition and maintenance comparisons reflect evaluations of all 12 schools, however.

Injury Reporting:

All injuries to football players in the sample schools were reported through the National Athletic Injury/Illness Reporting System (NAIRS), established by The Pennsylvania State University in 1974. NAIRS receives weekly reports, submitted by team trainers or physicians, of injuries and illnesses sustained by members of an athletic team during practice and during competition. In this study injuries and illnesses were classified by NAIRS into four categories, as follows:

1. *Minor* - any reportable injury/illness (other than dental or head injuries) that did not prevent an athlete from returning to practice or competition for longer than seven days following the injury or illness.
2. *Significant* - all head and dental injuries (regardless of time lost from play or practice), and any injury/illness that kept an a thelete from returning to play or practice for longer than seven days.
3. *Major* - any significant injury/illness that prevented a player's return to practice or competition for 21 days or longer.
4. *Severe* - any permanently disabling injury, such as paraplegia.

Injuries/illnesses were reported on standard forms to NAIRS and coded into the system's data bank. Trainers of the cooperating schools included in their reports the location of the activity at the time of injury (playing field, practice field, or elsewhere) and their options about the likelihood of a casual relationship of playing surface to injury (definitely related, perhaps/possibly related, or definitely not related).

At the end of the season, data collected during the football season of the 12 schools - nature and category of injuries, condition of the field (wet, frozen, etc.) when the injury occurred, and the opinion

of the trainer as to the relationship of the playing surface condition to occurrence or severity of the injury were compiled for study and analysis by the authors of this study.

Injury reports from two of the schools were not compete, and these schools were not included in the comparisons of injuries to conditions of playing surfaces.

Field Assessment:

School representatives provided information about maintenance practices and uses over the previous year. Maintenance practices included fertilization, liming, aeration (core cultivation), mowing, irrigation, overseeding, and control of weeds, insects and diseases. Uses included football games and practices, other varsity and intramural sports, physical education classes, band practices, community activities, and other activities. Estimated numbers of occurrences for each use were obtained.

Game and practice fields were evaluated twice - first in August, prior to or during preseason football practice, and again in early November as the season was ending. Inspections and evaluations were made by two turfgrass specialists from the College of Agriculture. Data were collected on kinds and amount of turfgrass, kinds and amount of weeds, total vegetative cover, turfgrass density, total weed coverage, smoothness of the surface, vegetative clumps, and stones on the surface. The recorded ratings represented a consensus. Data for subjective evaluations were assigned code numbers for use in statistical analysis. Evaluators inspected game fields at nine areas (between inbound hash marks and near each sideline at midfield and near each goal line). Areas inspected on the practice fields were selected to represent obvious differences in the playing surfaces. As part of the final field inspection, each field was also characterized according to undulations (free draining swales), depressions (which could hold water), crown or slope, and internal drainage. In contrast to ratings for natural undulations or depressions, the field roughness rating was an indication of holes and other irregularities caused by play. Also during the initial visit, soil samples were taken for determination of soil textural class, bulk density, pH, and available phosphorus (P) and potassium (K). Samples for bulk density represented the more intensively used portions of the fields. The percentages of sand, silt, and clay and the textural class of the surface soil were obtained by particle size analysis using a hydrometer method. Bulk density, the mass of soil per unit bulk volume, was determined from 10 soil cores, each an inch in diameter and 2.5 inches long. Samples from the surface 2.5 inches were used for pH determination using a 1:1 soil-to-water paste, and for phosphorus (P) and potassium (K) using Bray No. 1 and neutral, normal ammonium acetate extractants, respectively.

Upon completion of the second evaluation, Penn State specialists prepared a letter that described field conditions and suggested maintenance and/or renovation programs for fields at each school.

"As many as 20% of field injuries could have been prevented... by more favourable field maintenance."

Characterization of Data:

The number of injuries occurring during games (expressed as injuries per 1000 exposures) was compiled for the total sample of 10 schools and for each individual school. Data were summarized to indicate the number of reported injuries on each field, the relation of injuries to field conditions, and the number of injuries within various body-part categories.

Statistical procedures involving Spearman rank-order correlations for non-parametric data were determined to ascertain the possible relationships among the incidences of injury, field characteristics, and maintenance practices. The variables used in correlations were as follows:

Soil Properties: Sand (%), Silt (%), Clay (%), Bulk Density (g/cc), pH, Available P (lb/A) and Available K (lb/A).

Field Surface Rating Codes For Undulations, Depressions and Roughness: 0 = none, 1 = few, 2 = moderate, 3 = many, 4 = extreme.

Field Rating Codes for Stones (1 cm diam.): 0 = none, 1 = few, 2 = many.

Field Rating Codes for Vegetative Clumps: 0 = none, 1 = few, 2 = many.

Vegetative Characteristics Rating Codes:

Aug. & Nov. Cover: 0 to 9 where 0 = none, 9 = 100%

Aug. & Nov. Weeds: 0 = 2%, 1= 2 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 75 to 100%.

Aug. & Nov. Density: 0 = bare, 1 = thin, 2 = moderate, 3 = dense.

Maintenance Factors:

Nitrogen fertilization (lb/1000 sq. ft./year)

Aeration or core cultivation (no. of passes/year)

Mowing height (inches)

Use Rating: 0 = light, 1 = moderate, 2 = heavy, 3 = severe

Overall Field Rating: 0 = poor, 1 = fair, 2 = good, 3 = excellent.

Injuries - possibly or definitely field related (number).

When field conditions varied across a field, ratings used for correlations were representative of the area between the inbound hash marks.

Discussion of Results

Reported Injuries

A total of 210 injuries were reported by the 10 participating schools. Of these injuries, 96 occurred in varsity or junior varsity games, 4 in practice games, and 110 during scheduled practices. Of these injuries, 152 were classified as minor and 58 were significant. Of the significant injuries reported, 23 were major. No severe injuries were reported. The 10 schools had a total of 35,155 exposures during the football season (31,816 and 3,339 in practice and games, respectively). Rates of injuries per 1000 exposures were 4.21 for minor injuries, 1.59 for significant injuries, and 0.65 for major injuries.

Although the number of injuries sustained in practices was about the same as that in games, the number of exposures during practices, based on the average size of squads (practice or game), and the number of sessions (practice or game) was nearly 10 times as great as the number of game exposures. However, the severity of contact and intensity of play during the games probably were considerably greater than for the practice sessions.

Of the 210 injuries reported, 12 (5.7 per-

cent) were definitely field related, 15.2% were considered possibly field related, and 76.7 percent were definitely not field related. In the judgement of the trainers responsible for recording the data on location at the time of injury, a total of 44 injuries (20.9 percent) may have been caused by poor field conditions. On the basis of these data, it can be estimated that as many as 20 percent of the reported injuries could have been prevented or perhaps rendered less severe by more favourable field conditions. Safety conditions should thus be an incentive for the construction and maintenance of high-quality playing surface, for practice as well as games.

Within each body-part category, injuries are further classified according to their relation to field conditions. As would be expected, most of the injuries judged to be related to field conditions involved the lower extremities (i.e., hip/leg, knee, and ankle/foot). Also, it should be noted that the majority of injuries to lower extremities were classified as definitely not field related or, in other words, they were considered by the athletic trainers in attendance at the time of occurrence to be injuries likely to have been sustained regardless of field conditions.

Field Characteristics

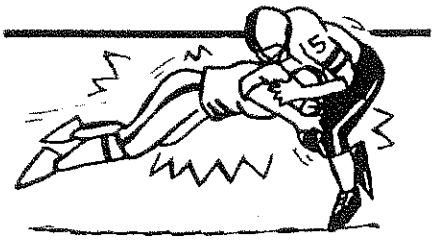
Field Maintenance: Data collected on maintenance of game and practice fields indicated considerable variation between fields at a particular school as well as among fields of different schools. Although practice fields were much more intensively used than were the game fields, they received less care.

Mowing heights were similar on game and practice fields, but game fields received more nitrogen fertilization and more aeration than practice fields. Game fields averaged 2.0 lb. N/1000 sq. ft. compared to 0.2 lb. N/1000 sq. ft. for practice areas.

Herbicides were used for weed control on 25 percent of the game fields: not one school reported use of weed killers on practice fields. All fields receiving weed control chemicals were treated with a preemergence crabgrass herbicide and a combination herbicide for broadleaf weed control.

Eighty-three percent of the 24 fields involved in this study were overseeded in the spring. Only 75 percent of the 12 playing fields and 25 percent of the 12 practice

Practice fields were used more, yet received less care than game fields.



fields were aerated. Not one of the schools had access to a disk seeder, and only a few schools had access to aerators. Some of the fields were thus overseeded without adequate seedbed preparation. Without the seed-to-soil contact provided by proper preparation of the seedbed, success of the seeding is highly unlikely.

Field Conditions: Game fields were in better condition than practice fields. In general, game fields had smoother surfaces, lower bulk densities (less compact soil), fewer weeds, more vegetative cover, and more dense turf. The better conditions on the game fields are no doubt a reflection of better construction and maintenance practices. Soils on all fields were medium or fine textured and were distributed among the following textural classes: loam, silt loam, clay loam, silty clay loam, and silty clay. Kentucky bluegrass was the predominant turfgrass species on most fields. Perennial ryegrass had been used to overseed fields: in some instances, the ryegrass population approached or exceeded that of Kentucky bluegrass.

Weed cover decreased during the season, primarily because of the poor wearing qualities of species such as clover and knotweed, and loss of summer annuals such as crabgrass, goose grass, and knotweed. Lower ratings for vegetative cover during the second of the two evaluations were associated with reductions in weed populations. Turf density likewise decreased during the season: most practice and some game fields were nearly or entirely without vegetative cover between the inbound hatchmarks at the second of the two field evaluations.

Additional or more effective maintenance practices (i.e., aeration, fertilization, overseeding, and weed control) were needed on most of the game fields and on all practice fields surveyed in this study. Practice fields were used more than game fields, but received lower levels of maintenance. All practice fields in this study were considered to be in poor condition, thus presenting surfaces potentially more conductive to player injury.

Relationship Between Various Field Variables: Correlations were used to indicate a relationship between two variables. Two variables may be correlated because one directly affects the other, or because both are influenced by an external factor. A negative correlation coefficient indicates that one variable decreased as the other increased.

Statistically significant correlations based on data from all fields were listed. In general, correlations indicated that the field with better maintenance practices also had better field conditions. good maintenance practices seemed to be a carryover of good construction methods. For instance, factors associated with higher rates of nitrogen fertilization were fewer undulations and depressions, more aeration, lower bulk density, fewer weeds, and greater cover. Factors associated with increased aeration were higher nitrogen fertilization, fewer weeds, and greater cover early in the season. Fields with the most depressions also had more undulations, a rougher surface, more stones, less dense turf, less cover, less nitrogen fertilization, and severer use.

Good cover prior to the season was associated with higher N fertilization, more aeration, greater density, less roughness, fewer depressions and stones, and less use. At the conclusion of the season, better cover was associated with good cover in August, greater density in August and November, smoothness, fewer depressions and undulations, lack of stones, less use, and fewer weeds in August.

The highest correlations with use ratings were the negative correlations with density in August and with cover in August and November. Cover in November gave the best correlation with overall field rating.

Correlations were also determined for game fields only and practice fields only. Fewer significant correlations occurred when the sample was limited to either game or practice fields; however, the results tended to support the relationship found when all fields were considered. The complexity of interpreting correla-

tions can be illustrated by the negative correlation between aeration and November density for game fields. One might question the result because it seems that a better aerated field should better support a turfgrass stand. On the other hand, fields that have a less dense cover are in greater need of aeration, and the data suggest that they are getting more.

Recommendations for Field Improvement: Good fields were associated with good management programs. Some fields, however, were poor because of construction methods and needed renovation beyond that provide by normal maintenance practices. Suggestions for maintenance and renovation programs were sent to each school following the second field evaluation. Subsequent visits have indicated that those schools that followed these suggestions have substantially improved their fields.

Methods for getting information about construction, maintenance, and renovation of fields to those in charge of field management must be implemented and improved. Valuable information is published in various forms, but it may not be reaching those having the greatest need. Chalmers (Tech. Turf Topics 7: 1982) reported that a survey of football field managers in Virginia indicated that 78 percent were not happy with the turf quality of their fields and 94 percent wanted to improve the quality of the fields. County extension personnel, extension specialists, turf consultants, representatives of turf equipment and supply companies, and others involved in turfgrass management can and usually are quite pleased to provide guidance and information about athletic field maintenance.

The quality of construction and maintenance use for school fields may be related to socioeconomic factors within the community. Our results indicted a trend for better maintenance practices on better constructed fields. Such a trend may have been coincidental, but it should be an incentive to construct and maintain high quality playing surfaces.

In general, better field conditions were associated with better maintenance. Schools with well- constructed fields often had better turf management programs. Practice fields were used more than game fields, but received lower levels of maintenance and were in poorer condition. Additional or more effective maintenance practices (i.e., aeration, fertilization, overseeding, and weed control) were needed on all practice fields and most game fields evaluated in this study.

[Reprinted from The Turf Line News, Vol. 120, No. 2, pp. 28 - 33, 1994]

GRASS CLIPPINGS

In a monocot the leaf sheath is often a structural or support element. The overlapping sheaths form a tube through which the new leaf or stem grows. An extreme example is the banana "tree." A fifteen-foot 'trunk' is formed by overlapping leaf sheaths. The stem remains below ground until flowering, when a flexible stem snakes up an out through the top to form flowers and fruit.

[Madison - Principles of Turf Culture]